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Notice of Proposed Determination: Regulatory Responses for Spray Polyurethane Foam Systems Containing Unreacted Methylene Diphenyl Diisocyanate

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The Department of Toxic Substances Control (DTSC) proposes that the manufacturers of Spray Polyurethane Foam Systems Containing Unreacted Methylene Diphenyl Diisocyanate (SPF Systems) shall be required to implement the following regulatory responses to protect the health of SPF Systems users:

1. Provide information to consumers and users in California (pursuant to § 69506.3 of title 22 of the California Code of Regulations¹);
2. Implement use restrictions that mandate training prior to the sale of the Priority Product (pursuant to § 69506.4(e)); and
3. Advance green chemistry and engineering by collectively investing \$8 million to fund grants to develop or make progress towards safer alternative(s) (pursuant to § 69506.8).

Synopsis

The mission of the California Safer Consumer Products (SCP) Program is to advance the design, development, and use of products that are chemically safer for people and the environment. To accomplish this, the SCP Framework Regulations establish a process for regulating product-chemical combinations, referred to as Priority Products, that have the potential to cause harm. This process is outlined on the [DTSC website](#) and is discussed in the context of SPF Systems, below.

In 2018, pursuant to the process developed in the SCP Framework Regulations, DTSC finalized a rulemaking to list Spray Polyurethane Foam Systems Containing Unreacted

¹ All subsequent citations are to title 22 of the California Code of Regulations, Chapter 55, unless otherwise noted.

Methylene Diphenyl Diisocyanate (SPF Systems) as a Priority Product. Priority Products are those identified by DTSC to have potential for exposure to the Chemical of Concern, in this case Methylene Diphenyl Diisocyanate (MDI), and the potential for that exposure to result in significant or widespread impacts. The primary objective of regulating SPF Systems as a Priority Product was to protect users of SPF Systems from exposure to MDI, which is a potent sensitizer, i.e., a substance that provokes allergic responses, including asthma.

The Priority Product listing was supported by the Department's [Technical Report](#) that documented the potential for exposure to MDI during use of SPF Systems, and the potential for such exposures to result in adverse health impacts. MDI can elicit allergic responses in both the respiratory system, as asthma, and in the skin, as allergic contact dermatitis. Users of SPF Systems may become sensitized to MDI after just one or two exposures to it. People who become sensitized to MDI can experience life-threatening asthma attacks when subsequently exposed to extremely low levels of MDI. In laboratory animals, long term exposure to high concentrations of MDI caused fibrosis, or scarring, in the respiratory system.

DTSC's decision to list SPF Systems as a Priority Product is intended to protect users of both types of SPF Systems: high pressure SPF Systems used by professionals, and a low-pressure version primarily used by "do-it-yourself" users (DIY users) for small jobs. These systems spray reactive chemicals on to walls, roofs, and other building surfaces. As the chemicals react, they form a foam that expands and then cures (hardens), forming the insulation. The concern for exposure is highest when the chemicals are initially sprayed and persists until the product cures. Professional spray foam installers have the greatest potential for exposure since they use SPF Systems routinely and the high-pressure SPF System aerosolizes more MDI.

Listing SPF Systems as a Priority Product triggered requirements on manufacturers of SPF Systems to either eliminate or replace MDI in their product or complete an Alternatives Analysis. The manufacturers of SPF Systems that sell their products in California will be referred to, hereinafter, as Responsible Entities (REs).

Based on the results of the Alternatives Analysis, DTSC evaluates a menu of potential regulatory responses and selects one or more that it determines will best prevent or manage the potential adverse impacts of exposure to a Chemical of Concern from a Priority Product; thereby protecting public health and the environment. In this evaluation, DTSC gives preference to regulatory responses providing the greatest level of inherent protection. As detailed in §§ 69506, DTSC may implement one or more of the following regulatory responses:

- Supplemental Information and Regulatory Response Revisions;

- Product Information to Consumers:
- Use Restrictions on Chemicals and Consumer Products:
- Product Sales Prohibition;
- Engineered Safety Measures or Administrative Controls:
- End-of-Life Management Requirements;
- Advancement of Green Chemistry and Green Engineering; and
- No Regulatory Response.

On October 4, 2021, a consortium² representing 17 REs submitted their revised, Abridged Alternatives Analysis Report (AA Report). An Abridged Alternatives Analysis is submitted when REs have not identified a feasible alternative. Submittal of an AA Report allows the REs to continue selling SPF Systems in California. The REs evaluated several types of alternatives, including those that do not rely on MDI and alternatives that may reduce exposure to MDI. But the REs did not find these to be functionally acceptable nor technically or economically feasible.

DTSC issued a Notice of Compliance for the AA Report on February 8, 2021. Subsequent steps in the regulatory process were stayed due to the Fresno Superior Court's decision in American Chemistry Council, et al. v. DTSC, et al. Both parties appealed the superior court's judgment and DTSC prevailed, with the Court of Appeal upholding DTSC's statutory and regulatory authority, as well as affirming DTSC's compliance with the Administrative Procedure Act and CEQA. DTSC is now able to implement the next steps of the regulatory process.

Pursuant to § 69505.4(b)(4), two regulatory responses are required when an RE completes an Abridged AA Report and does not select an alternative: providing information to consumers (§ 69506.3) and advancing green chemistry and engineering (§ 69506.8). Providing hazard information to users of SPF Systems will give them the knowledge they need to protect themselves from MDI exposures. Research into safer alternatives may help to, eventually, eliminate or replace MDI in SPF Systems or to engineer improved SPF Systems that reduce users' exposure to MDI. In addition, because knowledge about the proper use of SPF Systems is an important tool for users to protect themselves from exposures to MDI, DTSC proposes to implement a use restriction (§ 69506.4(e)) to mandate training before the sale of the product.

² Originally, the consortium represented 17 REs that submitted the Abridged AA. Due to mergers and acquisitions, there are now 15 REs in the consortium.

These regulatory responses are intended to protect users of SPF Systems from exposure to, and adverse impacts from, MDI and to advance the development of chemically safer products. The description of each proposed regulatory response, the rationale, and information supporting the Department's determination follows. Each regulatory response has a corresponding implementation date.

Release of this Notice begins the public comment period on DTSC's proposed regulatory responses. A public workshop to detail the regulatory responses will follow. Following the public comment period, DTSC will issue the Notice of Final Determination on regulatory responses. After the final notice, DTSC cannot amend or alter the regulatory responses and the REs will be required to implement the regulatory responses, as well as provide the appropriate notifications, pursuant to §§ 69506.10.

Instructions on how to comment and the duration of the comment period can be found on [CalSAFER](#).

Applicability

The responsible entity is required to complete these regulatory responses for all the Priority Products for which an alternative is not selected.

The brand names and associated product names covered by the proposed Regulatory Responses are: [The list is specific to manufacturer and has been intentionally left out of the draft for public comment. You may view the Priority Products from each manufacturers' submission on [CalSAFER](#)].

Regulatory Responses

Regulatory Responses are actions taken by DTSC to mitigate the potential for adverse impacts from exposure to a Chemical of Concern from a Priority Product. This section elaborates on each selected regulatory response and summarizes DTSC's rationale, and the selection factors in § 69506(c), that DTSC considered in selecting it.

1. Product Information for Consumers (§69506.3)

This regulatory response entails informing consumers about the safe use and handling of SPF Systems and the hazards of MDI before purchasing the product. The requirements consist of providing safety and hazard information on the product label and on any websites where the product is made available for sale, as well as including instructions inside the product package to inform consumers of the hazards of MDI, training and additional resources. The goal of this regulatory response is to have

consumers see and understand health and safety warnings and requirements before purchasing the product.

Rationale

DTSC has determined this regulatory response is applicable pursuant to § 60506.3 because a safer alternative has not been implemented. Furthermore, § 69505.4(b)(4) requires this regulatory response when an Abridged AA has been submitted, to “reduce the potential impacts associated with the Priority Product until a safer alternative can be researched and developed” ([Final Statement of Reasons for the SCP Framework Regulations](#)).

Consumers will more likely use and dispose of the product safely if health information and necessary precautions are presented in an easy-to-understand manner on the product packaging or on a retail display. Making this information accessible before purchasing the product allows the customer to understand the hazards of using the product and how to mitigate potential exposures. Therefore, if the manufacturer sells the product online, it is critical that this information also be provided on the same webpage where the consumers select the product for purchase.

Required Information for Consumers

The following information would be required with all SPF Systems (both high- and low-pressure SPF systems)

Upon the effective date of the Notice of Final Determination and continuing for as long as each of the products listed above are placed into the stream of commerce in California, the responsible entity shall ensure that all the information in §§ 69506.3(b) is made available to the consumer or user prior to purchase of the product. The information should be in easily seen, legible, and in an understandable format. Any text must be provided, at a minimum, in English and Spanish. This information must be:

- Posted in a prominent place on the landing page of the product website and on any importer’s website in an accessible format; and
- Provided to consumers at the point of sale including:
 - in a prominent location on the product packaging or in accompanying written material that is accessible without breaking the product seal; and/or
 - in a prominent place at the point of retail display. For products offered for sale online, the retail display is the web page on which the product is offered for sale.

The following information must be included on the label, packaging, covering the cylinder fittings, or on the web page.

Note: The numbers below are aligned with § 69506.3(b)

1. Manufacturer's name and importer's name, and, if applicable, the name of any other entity listed on the product label.³

2. Brand name(s) and product name(s), and a description of the product.³

3. The known hazard traits and environmental or toxicological endpoints for MDI in easily understandable language that is non-technical in nature; for example, "This product contains methylene diphenyl diisocyanate (MDI). Exposure to MDI can cause allergic reactions, asthma, and damage to the respiratory system."

4. If applicable, a statement informing consumers that the product must be disposed of or otherwise managed as hazardous waste at the end of its useful life. (For California hazardous waste information, see <https://dtsc.ca.gov/rao/>.)

5. Any safe handling and storage procedures or other information needed to protect public health or the environment. This includes precautions that users should take to prevent or limit exposure to MDI, appropriate first aid in case of exposure, and accidental release procedures. This includes:

5.1 A statement directing users to take the free online training, for example the Spray Polyurethane Foam Chemical Health and Safety Training offered by the Center for the Polyurethanes Industry (CPI), or equivalent training, before opening the product. An easy way to link to the required training, such as a Quick Response (QR) Code, is preferred.

5.2 A simple graphic depicting the required safety equipment such as, at a minimum: a respirator with cartridges, eye protection, gloves, protective clothing and ventilation.

5.3 The following statements

- Do not inhale or allow skin or eye contact during use. Wear a respirator and eye and skin protection.

³ According to the Abridged AA Report submitted to the Department on October 14, 2020, this information is already provided due to overlapping requirements from OSHA HCS and the Federal Hazardous Substances Act (FHSA)

- Do not allow anyone else into the work area where the product has been sprayed until the product has fully cured.
- Ensure that the area is well-ventilated.
- This product contains methylene diphenyl diisocyanate (MDI). Exposure to MDI can cause allergic reactions, asthma, and damage to the respiratory system.

5.4 The Globally Harmonized System warnings for health hazard, exclamation mark, and flammability should be clearly visible.

5.5 A statement placed on top of the “A” and “B” side bung hole covers informing the user that training on the safe use and handling of the product is required. The statement also needs to include instructions on how to obtain the required training. Providing an easily accessible link, for example a QR code, is preferred.

6. End-of-life management requirements specified by law, and any existing end-of-life management program(s) for the product.

7. The manufacturer’s website address and the importer’s website address where the consumer can obtain additional information about the product, the adverse impacts associated with the product as identified in the AA Report for the product, and proper end-of-life disposal management of the product.

The following information is required with Low Pressure SPF Systems

Low-pressure SPF (LPF) Systems can be purchased by DIY users thus, these products must include warnings and explicit instructions to ensure users can protect themselves from the potential adverse impacts related to exposure to MDI. The instructions may be included inside the package with the canisters or attached to the outside of the packaging. All information must be consistent when presented in different locations (e.g., product packaging, user guides, Safety Data Sheets, webpages where the products are sold) and must not minimize the hazards or health risks associated with using the product. DTSC’s objective in imposing this requirement is to ensure consumers are provided with enough information about the health hazards and safe handling/best practices so they can take proper precautions when using the product.

Each LPF System must contain instructional information that uses images and limited text to convey the importance of the required personal protective equipment and safe handling and installation procedures. The instructions must be marked with text stating “READ BEFORE USING THE PRODUCT”. The instructions must also include a

statement indicating that users must take the free, online training to learn to use the product safely. At a minimum, the instructions must include the following information:

- Instructions to access free online training, for example, a Quick Response (QR) Code that provides access to the required training.
- Images with text depicting a respirator with cartridges, eye protection, gloves, protective clothing, and ventilation.
- Additional information about the hazards of MDI, such as: “This product contains methylene diphenyl diisocyanate (MDI). Exposure to MDI can cause allergic reactions, asthma, and damage to the respiratory system. Protect yourself by properly using personal protective equipment per the equipment manufacturer’s instructions.”
- Safe work practices, including avoiding hot surfaces, not using the product in confined spaces without adequate ventilation, not smoking, and exiting the work area for breaks, drinking, eating, etc.
- A warning about preventing others from entering the work area unless they use the same personal protective equipment as the applicator.
- A warning about not prematurely reoccupying the work area including guidance on safe re-entry time to ensure no exposures occur.
- First aid and emergency response procedures in case of accidental exposures.
- Guidance on how to properly store the products and other information needed to protect public health or the environment during the life of the product, including precautions that users may take to prevent or limit exposure to MDI.
- A statement with instructions on safe disposal of un-used chemicals.
- A statement informing consumers how the product containers and their contents must be recycled or safely disposed of in accordance with federal, state, and local laws and regulations at the end of its useful life or otherwise managed as a hazardous waste, if applicable.

These instructions need to be presented in an easily accessible manner by utilizing simple text, graphic images, and highly visible colors. Written information must be provided in multiple languages, at a minimum in English and Spanish, but preferably also in Chinese, Tagalog, Vietnamese, Korean, and any other languages that would be highly relevant to SPF System users in California.

Regulatory Response Selection Factors

Required Regulatory Responses

Pursuant to § 69506.3 and § 69505.4(b)(4), this regulatory response (RR) is required for SPF Systems sold in California because the REs did not select an alternative.

Public Health and Environmental Protection

Degree and speed with which the RR can address the adverse impacts

In the absence of safer chemistries, providing information to consumers and users can be implemented quickly and can help protect their health while safer alternatives are sought (see the Green Chemistry and Green Engineering RR).

The Ability of End-users to Understand and Act upon the RR

The use of images; simple, clear statements; and multiple languages should allow the end-user to understand the safety concerns associated with MDI exposure.

Private Economic Interests of Responsible Entities (REs)

Existing Federal and California state regulatory requirements

Labeling of high-pressure SPF systems (HPF) is required by OSHA 29 CFR Section 1910 and by the Federal Hazardous substances Control Act 16 CFR sections 1500.121 (a)(1). DTSC recognizes that the REs must comply with these existing regulations, but the additional information required by this RR will further benefit the users.

Cost of this RR Relative to Other RRs

The RR is required pursuant to § 69506.3; therefore, DTSC did not consider the relative cost of this RR compared to others. The cost of developing or refining information on the RE's website, sharing the required information for posting on distributor's websites, and updating product labels is expected to be relatively minimal.

REs' Practical Capacity Comply with this RR

This is an expansion of the product information that is currently provided to consumers; therefore, adding additional health and safety information to the product label, within the product package, and on a website should be achievable.

Government interest in efficiency and cost containment

Administrative burden of the oversight of the implementation of this RR and the ease of enforcement

The Department's burden and cost of ensuring that the required health and safety information is provided to consumers on an ongoing basis are expected to be modest. Staff may monitor manufacturer's websites, audit manufacturer's facilities, inspect products, or visit retail sites to verify that the required label and product information are available and compliant.

2. Use Restrictions on Chemicals and Consumer Products [§ 69506.4(e)]

The Department has determined that according to § 60506.4 the use of HPF and LPF Systems should be restricted to users and managers who have received adequate safety training. Therefore, DTSC proposes to require the REs to develop and institute a mandatory training program and ensure that all users of SPF Systems have successfully completed requisite training before sale of product.

DTSC has reviewed the Spray Polyurethane Foam Alliance (SPFA) current training program and has determined that it meets the minimum requirements of this RR for professional users. Center for the Polyurethanes Industry's (CPI's) current training program meets the minimum requirements of this RR for DIY users. As part of instituting this training requirement, DTSC strongly encourages the REs subsidize the training for SPF System users in California.

Rationale

This training program is intended to reduce the potential impacts associated with the Priority Product until a safer alternative can be researched, developed, and made widely available for both professional and DIY users.

Because the AA did not identify a safer alternative, the Department must implement other ways to protect workers, such as ensuring that workers have adequate training and knowledge to protect themselves. A robust and highly utilized training program benefits the manufacturer by limiting the potential for exposures to chemicals and product-related injuries and subsequent lawsuits.

Professional spray foam system-users likely benefit most from safety training since they face a greater chance of exposure. While the potential for exposure is less among DIY users than professionals, they need to have training also to protect themselves from exposures to MDI. DTSC approves of the RE's proposal to direct DIY users to the

training program by using QR codes on product labels and cylinder fittings. In addition, the REs must design a program to ensure that training is completed.

Training Program Description

- The training assessment must include a comprehensive presentation on the risks associated with using the product and an exam consisting of multiple questions on chemical safety, proper PPE-use, ventilation, and safe re-entry time.
- An ideal training program would include incentives for users to take the training and/or would compensate workers for their time to complete the training.
- Records of the training courses (details provided below) must be maintained for 3 years and made available to DTSC on request.

Benchmarking the success of the training program

HPF and LPF System installation professionals

One objective of this RR is to increase the percentage of California SPF professionals who are trained through an acceptable safety training program, with the goal of training all California SPF professionals within 3 years. Acceptable training includes the Spray Polyurethane Foam Alliance's (SPFA) training program or an equivalent program that covers the same safety content and includes an assessment.

One way to accomplish this goal to require purchasers of SPF to certify that all the workers who will use - or supervise the use of - the product, have successfully completed an acceptable safety training program. For example, REs may choose to sell only to contractors that are SPFA Accredited. SPFA offers an [accreditation program](#) that ensures that contractors "have made a commitment to work in compliance with stringent health and safety guidelines and best practices application procedures with requisite staff of SPFA-Certified [trained] professionals."

DIY Users

The REs shall develop a plan to demonstrate that DIY users have completed the safety training prior to purchasing the product. Acceptable training includes the free, CPI safety training or an equivalent program that covers the same safety content and includes an assessment.

Annual Reporting on the Training Program

Details of the training program will be compiled into a single annual report. The report will aggregate California-based results from all applicable training sites, documenting:

- The number of new trainees and relevant categories such as HPF professionals, LPF professionals, DIY users, and non-users (e.g. supervisors, managers).
- Details on training sessions: date of training, location of training (in-person or online), and the name of the organization that provided the training.
- The number of renewing trainees and their training level
- The number of trainees that moved up to a higher-level licensure
- Total SPF workers in California, with estimates of new and continuing members of the workforce
- Percentages of the classes completed in each of the available languages for California workers
- The proportion of sales for which training was verified
- Details of programs and promotions used to incentivize workers to take the training. These could include compensation for their time or other creative benefits, such as rebates for DIY users.
- Details of RE's audits of their customers and verification of the workers' training status.

Regulatory Response Selection Factors

Public Health and Environmental Protection

In the absence of functionally acceptable and technically feasible alternatives to current SPF formulations containing MDI, the Department recognizes mandatory training as a quick and effective way to reduce occupational exposures and the adverse impacts of MDI from SPF Systems.

Degree and speed with which the RR can address the adverse impacts

Training is essential to reducing exposure to chemicals of concern, especially for professionals who use a product routinely. This is a lower tier of inherent protection but will protect workers in the near-term while safer alternatives are sought.

The Ability of End-users to Understand and Act upon the RR

The REs will have flexibility on how to best implement the mandatory safety training program. It will be each RE's responsibility to ensure that the end-users of its products are aware of, and understand, the requirements complete the requisite training.

Will this RR place an additional burden on a sensitive subpopulation?

This regulatory response will place the responsibility of ensuring users of SPF systems are properly trained on product manufacturers. Since the manufacturers themselves generally are not the users of the product, it necessarily also places a responsibility on the users of the product to take the training. SPF manufacturers will be responsible for ensuring that workers who speak languages other than English and Spanish have access to training materials in a language they understand and that workers without internet access have a way to receive the training. One concern is that workers who are paid hourly may have to complete the required training on their own time. Ideally, the manufacturers of SPF systems will provide subsidies and incentives to allow workers to be compensated for their time spent in health and safety training.

Under the proposed regulatory responses, manufacturers would also be responsible for making training available to DIY users of SPF and for requiring these users to take the training. Manufacturers can provide incentives to help reduce the burden on DIY users, such as a rebate on the product for taking the training.

Private Economic Interests of Responsible Entities

Existing Federal and California state regulatory requirements

There are currently no mandatory training requirements for SPF workers. Some insulation contractors may have training under the California State Licensing Board for Insulation and Acoustic workers, but this training does not specifically address the safety requirements associated with installing SPF.

California Code of Regulations, Title 8, Section 3203 requires all employers to develop, implement, and maintain an effective injury and illness prevention program. If an employer has developed and implemented an adequate training program, then the chemical safety training requirements under this regulatory response are likely already met for many SPF system users and, therefore, this regulatory response would not impose any additional costs on the business. In some cases, the SPF System users may be contractors and not fall under the employee/employer relationship; OSHA-required training on injury and illness prevention may not currently be available to such workers. DIY users are not covered under OSHA requirements.

Cost of this RR Relative to Other RRs

CPI and some individual companies already make their training programs freely available to interested users; there would be no further costs associated with developing the training program. There may be costs associated subsidizing and incentivizing the training. Similarly, collecting data on the prevalence of workers taking the training and for tracking the metrics of success, as well as for annual reporting to DTSC will cost the REs. However, the cost to DTSC of implementing the Product Sales Prohibition RR would have a much greater economic impact on the REs. Until a safer alternative is developed and deployed, training workers is a cost-effective approach that may reduce adverse impacts.

Practical Capacity of the of the RE to comply

Several individual companies and at least one trade association have already developed safety training programs that meet the minimum requirements. The Spray Polyurethane Foam Alliance certification program provides records to verify a worker's training status and an accreditation program to verify that a company's workers have had appropriate training. These could serve as a model for the REs if they elect to develop their own approach, or the REs could rely on these programs to ensure that workers are trained before the sale of the product. In addition, these pre-existing programs make compiling the statistics on training readily achievable.

The REs have flexibility on how they institute this mandatory training program and can determine the best way to comply. DTSC has specified metrics that the REs must collect on their training program. These metrics will help the REs to set goals regarding the training and help measure compliance.

Government Interest in Efficiency and Cost Containment

Department's administrative burden and ease of enforcing

DTSC expects the REs to ensure a mandatory training program is implemented and that workers receive safety training. The annual reports from the REs will inform DTSC's compliance efforts. Receiving and tracking these reports should pose a modest administrative burden on DTSC and the costs are expected to be absorbable.

3. Advancement of Green Chemistry and Green Engineering (§ 69506.8)

Establishment of the Green Chemistry Innovation Fund for SPF with an Independent Review Panel

The Abridged AA Report did not identify any commercially available, technically feasible alternatives to the use of MDI in SPF systems. In the absence of a safer, feasible alternative to the use of a Chemical of Concern in a Priority Product, both the Green Chemistry statute and the SCP Framework Regulations authorize DTSC to require product manufacturers to fund green chemistry or green engineering research to reduce the adverse health impacts of Priority Products (pursuant to § 69505.4(b)(4) and § 69506.8). Such research supports the goal of California's Green Chemistry statute to "significantly [reduce] adverse health and environmental impacts of chemicals used in commerce, as well as the overall costs of these impacts to the state's society, by encouraging the redesign of consumer products, manufacturing processes, and approaches." [Health and Safety Code section 25255].

DTSC has determined that the most effective way to stimulate green chemistry innovation, make progress towards commercialization of safer sprayable insulation, and protect workers from the adverse impacts of MDI is to broadly solicit research and development (R&D) proposals and provide financial support for the best proposals through the Green Chemistry Innovation Fund (GCIF). DTSC proposes that the REs continue to work as a consortium to sponsor \$8 million in grants over three years that will be selected via a competitive grant process. The GCIF and resulting grants will be administered by a third party and an independent review panel of experts will select the proposals for funding.

The goal of this Green Chemistry Regulatory Response is to initiate the development of transformative sprayable insulations that:

- are safer throughout the entire life cycle of the product,
- reduce hazardous chemical exposures to people involved in the manufacture, distribution, use or end-of-life of the product,
- reduce hazards to the environment,
- have high R-values and help to reduce greenhouse gas emissions,
- are durable,
- can seal gaps and crevices, and
- generally, meet or exceed the performance characteristics of SPF.

Another goal of this RR is to encourage investment in the redesign of SPF Systems that could reduce exposure to MDI. Improvements to these devices and systems may be quicker to develop and commercialize compared to new SPF formulations. Therefore, these improvements may reduce users' exposure to MDI while a green chemistry alternative is being researched and developed.

DTSC has identified several principles that are critical to the success of R&D projects conducted under the Green Chemistry RR. The grant process is an effective approach to incorporate these principles.

- **Impact and Significance.** The process will ensure funding for projects with the greatest impact and significance to achieve the RR's objective. These types of innovative projects will help to make progress towards a commercially available, safer alternative and lead to the development of new products and technologies that protect workers from MDI exposure.
- **Potential and Proximity of Commercialization.** The process provides an opportunity for all REs to work collaboratively to fund research that will protect users. Pooling industry resources to solve shared challenges can benefit individual companies, especially smaller REs that do not have R&D capacity to undertake R&D projects on their own. Proposals that involve collaboration across the value chain may receive more funding if the collaboration brings the project closer to commercialization (e.g., a sprayable, reactive polymeric insulation manufacturer and a chemical supplier who can ensure that an alternative is produced in sufficient quantities to replace MDI or an SPF System manufacturer and a SPF installer who is willing to test new products).
- **Transparency.** This process will be as transparent as possible – from selecting proposals to fund, to the research progress reports that will document the successes and challenges of the research. The progress reports will be public and posted on CalSAFER. The reports will provide a coherent update on the research. If applicable, a separate report may be provided only to DTSC containing trade secret information.
- **Measurable Achievement.** As proposed, interim progress reports from the grantees must be provided to the panelists selecting the grants, DTSC, and the public. DTSC will also require each funded project to provide a final, technical report and presentation. If possible given commercialization constraints, peer-reviewed publication is the preferred way to publicly disseminate results. Sharing intellectual property among the participating REs is also encouraged. Other deliverables may be applicable to each project.

Scope of the grants

The goal of the Green Chemistry Innovation Fund is to fund several grants that support multiple approaches to developing and commercializing safer alternatives. This multipronged strategy will invest in projects ranging from transformative green chemistry to projects that will improve SPF Systems to reduce users' chemical exposures. The SCP Framework Regulations describe eligible research or development projects, including those that use green chemistry or engineering to:

- Design a safer alternative to MDI in SPF systems;
- Improve the performance of a safer alternative to MDI in SPF systems;
- Decrease the cost of a safer alternative to MDI in SPF systems; and/or
- Increase the market penetration of a safer alternative to MDI in SPF systems (§ 69506.8).

Since users' health is the primary adverse impact associated with the current use of MDI in SPF, research or product development projects that strive to markedly lower exposure to MDI are also eligible for grant funding. Proposals from academics, not-for-profit institutes, and industry are eligible, and partnerships between different types of organizations are encouraged.

Proposed criteria that may be considered when grant applications are evaluated:

- scientific and technical merit,
- ability to meet the solicitation's goals and the applicability to spray foam insulation,
- extent to which the aims of the proposal are achievable within the period of the grant,
- risk-to-reward ratio,
- degree and speed with which adverse impacts to workers could be reduced or eliminated,
- potential for commercialization, and
- extent to which green chemistry and engineering principles are used or demonstration of other beneficial impacts throughout the product's life cycle.

The Panel

The creation of an independent review panel is critical to the scientific integrity of the Green Chemistry Innovation Fund. DTSC and the REs will establish an independent scientific panel to guide the research program, including, notably, reviewing the proposals received under this Request for Proposals (RFP).

The panel should consist of reviewers with expertise in green chemistry, green building and insulation (e.g., USGBC), polyurethane chemistry, and product development. Since different perspectives are also important, the panel should have representation from NGOs, academia, industry, and other government agencies. One non-voting DTSC staff person may sit on the panel. The panel will review the grant proposals against criteria it develops, based on DTSC's proposed criteria listed above and the principles laid out in this document; the panel will score the proposals to determine which should be funded. The rationale for forming the panel is:

- Product chemistries are complex, and it takes significant experience to understand the nuances associated with the product, especially the unique requirements of sprayable foam insulations in terms of reaction/curing time. None of the reactive polymeric spray foam products evaluated in the Abridged AA were free from sensitizers, indicating that innovation is needed to meaningfully improve the safety of these reactive sprayable foams.
- Product development expertise and industry experience are needed on the panel since the technical engineering of the SPF systems are quite complex. Including industry experts on the panel will help to better inform decision-making about the potential and proximity of commercialization.
- A panel of external experts representing diverse perspectives will be well equipped to evaluate all aspects of the research proposals—the scientific aspects and commercialization potential of potential alternatives, as well as their health, environmental, and economic impacts.
- Establishing this panel will promote a cross-disciplinary, collaborative approach to this RR, which is likely to prove more fruitful for advancing green chemistry.

The panel's main responsibilities:

- Design a suitable strategy to publicize the RFP.
- Develop and apply a process and criteria for evaluating the proposals and prioritizing the strongest ones for funding.
- Direct the grant administrator to allocate or disburse the funds.
- At the end of the grant period, provide a written assessment of the success of this grant program (i.e., not the research itself, just the program) and give an oral presentation to DTSC on how to improve future Green Chemistry RR programs.

Timeline

The REs shall announce and publicize the request for proposals associated with the grant within 6 months of the effective date of the Notice of Final Determination.

Rationale

The benefits of a grant process through the Green Chemistry Initiative Fund are many-fold. First, it allows for the solicitation and selection of the best proposals from academia and industry. In addition, it promotes collaboration among the REs and throughout the value chain. The Green Chemistry and Commerce Council (GC3; now called Change Chemistry) recognizes collaboration as a growth accelerator of green chemistry because innovation by itself, is not sufficient to drive commercialization. A more collaborative and open approach to R&D can help to amplify demand and de-risk new technologies leading to more successful commercialization⁴.

DTSC had hoped that the AA for SPF systems would have identified key research questions and areas where additional research is needed to develop safer alternatives to the current MDI chemistries. Unfortunately, the AA did not address these topics; we anticipate that a general solicitation will be more fruitful.

DTSC has considered other approaches for funding Green Chemistry research, but identified some concerning challenges:

- The capacity for internal research varies widely among the REs. Companies that are vertically integrated and produce both MDI and SPF likely have large R&D facilities with research scientists and engineers. In contrast, the smaller system houses may face significant challenges planning and executing meaningful research. Internal research will not promote collaboration.
- Transparency is likely harder to achieve with internal research.
- X-Prize-like competitions tend not to work well for academic researchers, provide little transparency (including measuring progress over the period of performance of a grant), and likely involve timeframes unsuitable for regulatory response.

A manufacturer that opts not to participate in the Green Chemistry Innovation Fund shall be required to conduct research by investing equivalent funds to commercialize a safer product. Research projects should be selected and conducted based on the principles above (impact and significance, potential and proximity of commercialization, transparency, measurable achievement).

⁴ Becker and Tickner. 2020. Driving safer products through collaborative innovations: Lessons learned from GC3's collaborative innovation challenge for safe and effective preservatives for personal care products. Sust. Chem & Pharma.

Regulatory Response Selection Factors

Required Regulatory Responses

Pursuant to § 69505.4(b)(4)., this regulatory response is required for SPF Systems that are sold and will be sold in California.

Public Health and Environmental Protection

Degree and speed with which the RR can address the adverse impacts

DTSC recognizes that progress towards a safer alternative to the current use of MDI in SPF Systems may be incremental and piecemeal. Moving towards green chemistry and a sustainable-chemistry economy will require investment and a change from traditional approaches to product innovation to ones that emphasize safer chemicals. While this RR likely will not immediately address the potential adverse impacts to SPF users, DTSC believes it will stimulate investment in green chemistry and, ultimately, adoption of safer alternatives.

Private Economic Interests of Responsible Entities

Cost of this RR Relative to Other RRs

The RR is required pursuant to § 69506.8; therefore, DTSC did not consider the relative cost of this RR compared to others. The Green Chemistry and Engineering RR is more cost effective than a sales prohibition and the REs may ultimately benefit from this RR and the subsequent development of a safer product.

Practical capacity of the REs to comply

This RR was designed to promote meaningful progress on safer alternatives to the current use of MDI in SPF systems. Pooling resources among the consortium members may allow faster progress on the development of a safer alternative and will facilitate the participation of smaller REs that may not otherwise have R&D capacity.

Government Interest in Efficiency and Cost Containment

The responsibility of implementing, executing, and completing the projects included in this regulatory response rests with manufacturers of SPF systems sold in California. DTSC will have an oversight role and will receive updates but will not be involved in the daily operations. DTSC views this as the most efficient use of resources to pursue safer products that will benefit Californians.

Notifications to Supply Chain

The Responsible Entity is required to notify all persons in California to whom the RE directly sells the Priority Product, other than the final purchaser or lessee, of the applicability of the Information to Consumer and Use Restriction (training requirement) Regulatory Responses to the product. The notification(s) shall be sent, with a copy sent to the Department, no later than thirty (30) days after receiving a final regulatory response determination notice.

Notifications to DTSC

REs are required to notify DTSC after the regulatory responses have been fully implemented. Each regulatory response may have additional reporting requirements, for example the “Use Restriction” requires an annual report on the training program for at least 5 years.

Public Comment

This Notice will be released for public input and DTSC will review and consider these comments before issuing a Notice of Final Determination that will communicate DTSC’s final decision on regulatory responses.

If you have any questions, please contact us at calsafer@dtsc.ca.gov.

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